Division of Air Quality

Department of Environmental Quality

Emerging Compounds

DAQ's investigation involving GenX and other PFAS from Chemours

- GenX emissions data
  - Started with only estimates
  - Required stack tests
  - Method development
  - First of its kind measurements

Chemours 2016 emissions estimates as originally reported to DAQ	Chemours revised 2016 emissions estimates as of October 2017	Latest emissions estimates, including information from January 2018 stack test measurements
66.6 lb/yr	594 lb/yr	2758 lb/yr

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We started with only emissions estimates. Those were generated by the facility using the ASPEN chemical process model.
DAQ required the company to conduct stack tests to get actual emissions measurements, however, there was no "off-the-shelf" stack test method for this compound. DAQ worked for months with the facility, their stack testing contractor and EPA to get to a point of agreement on the stack testing method and approach.
Early this year… in January and February actual stack testing was conducted at the facility… producing emissions measurements of the GenX compounds for the first time.
The data presented in the table shows how this situation has evolved… Chemours, initially estimated their emissions of the GenX compounds to be just over 66 pounds per year (for the year 2016). They later revised those estimates to be 594 pounds per year.
And now, based on a blend of actual emissions measurements from some of the primary emission sources… and estimates from other emission sources that have not been tested… we believe the annual emissions of the GenX compounds are over 2700 pounds per year.

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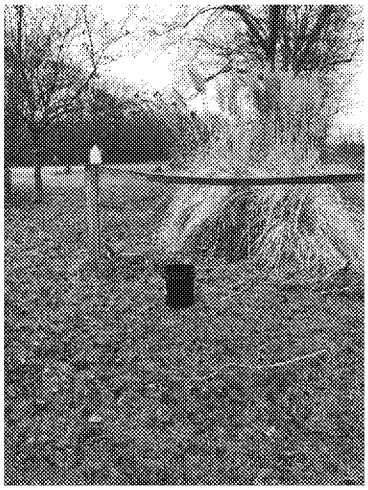
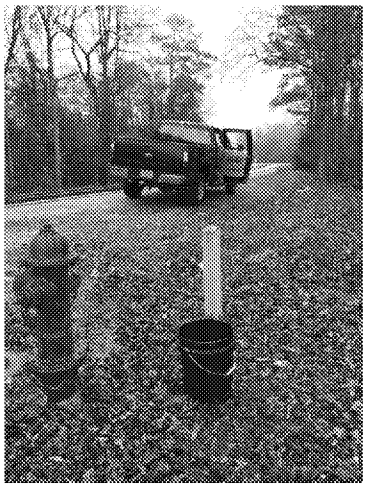
- **GenX ambient air quality data**
  - **Methods?**
  - **Wet deposition data - first of its kind**





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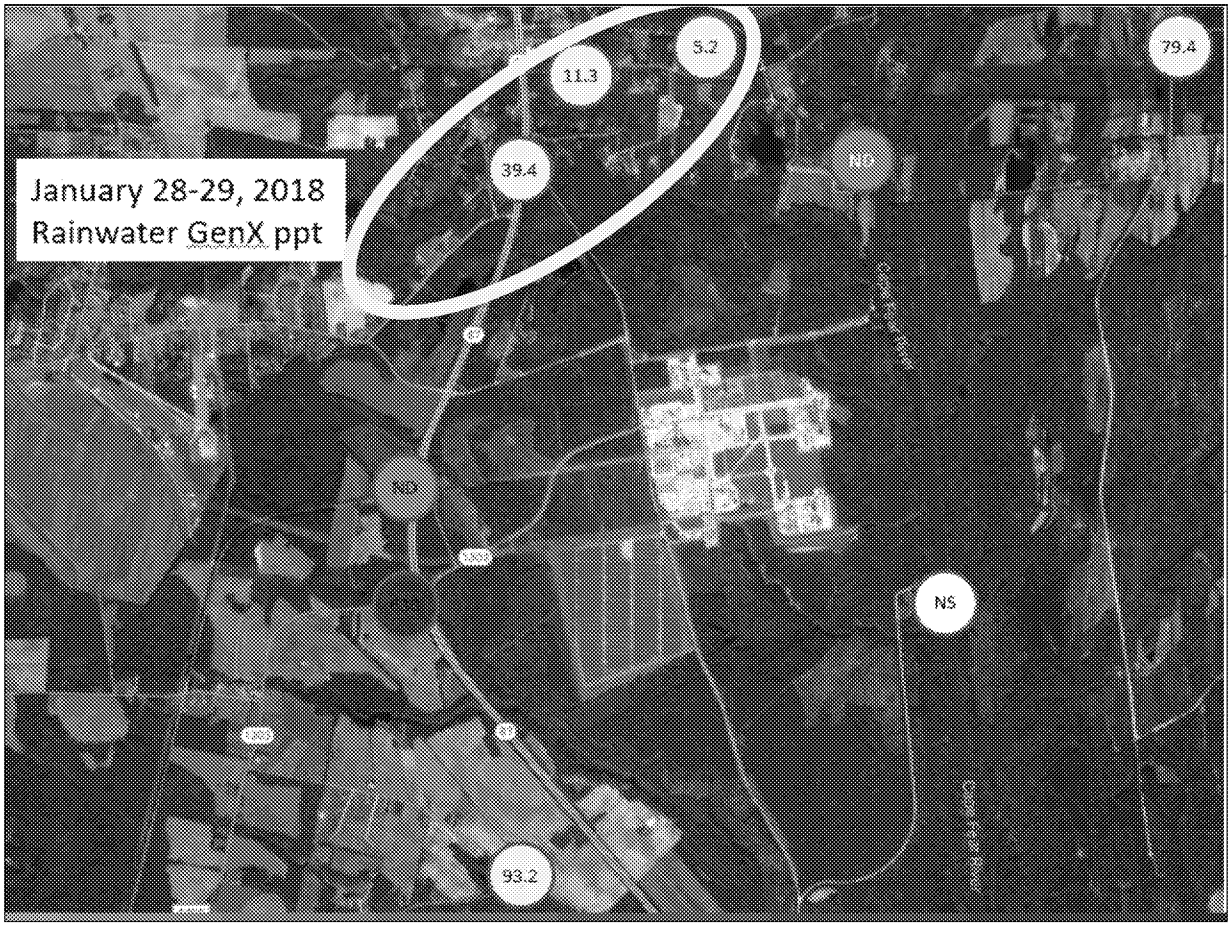
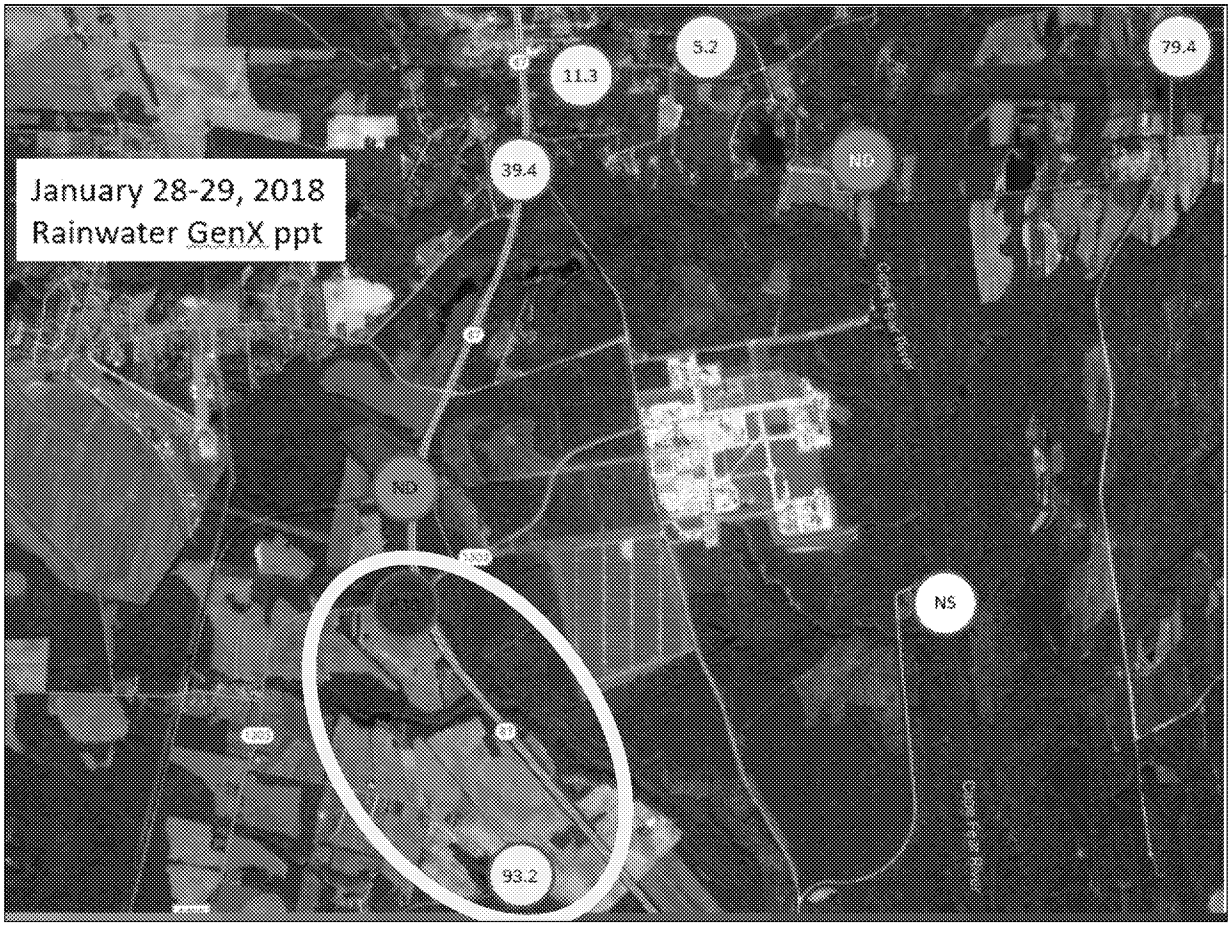
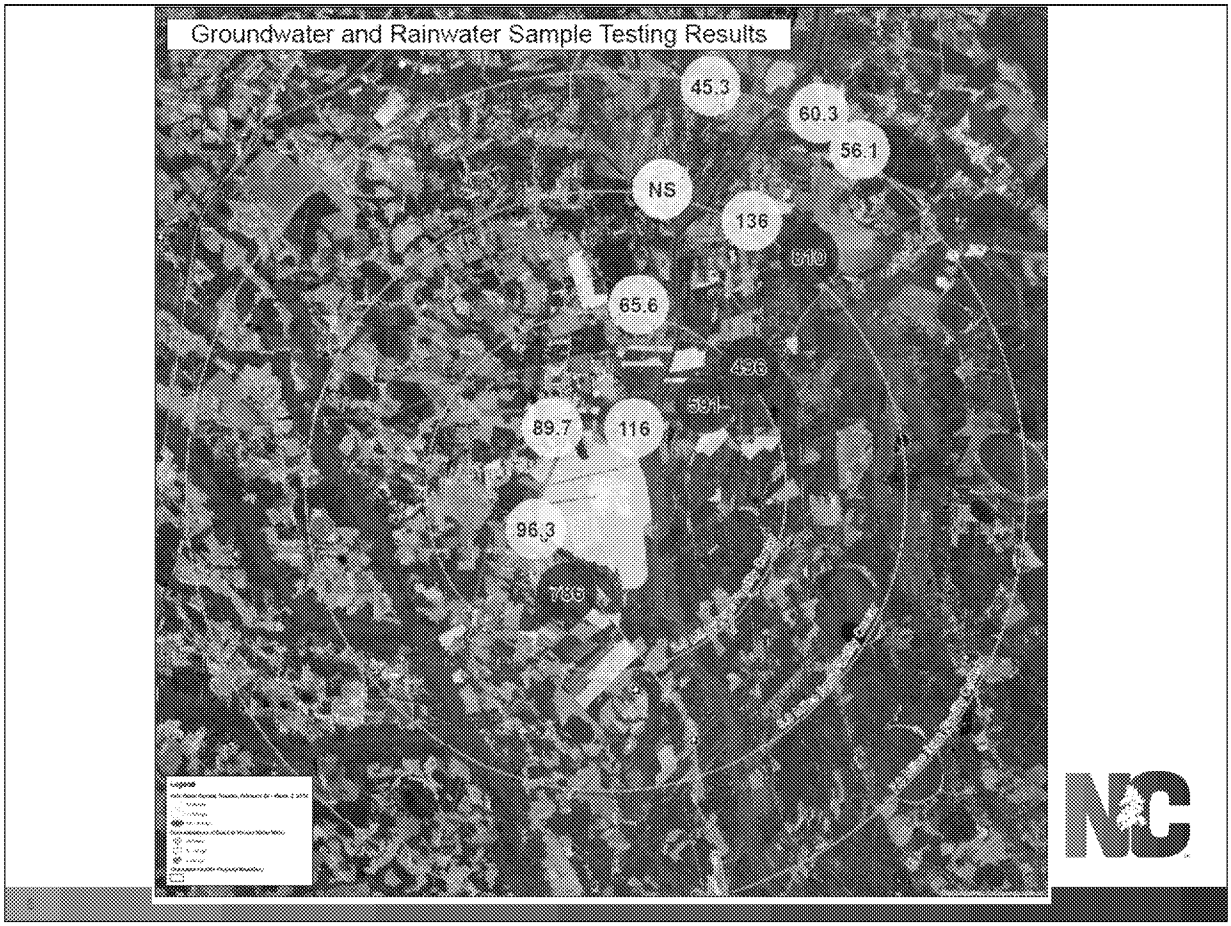
We have also been exploring how to measure the GenX compounds in ambient air.
After much discussion with our ambient air monitoring experts and EPA... there was not much agreement on how to measure the GenX compounds in ambient air.
But one thing we knew for sure was... we can measure it in water.
We did not have any suitable wet deposition monitoring equipment at the time... and we knew it would take time to get some and set them up... so staff got innovative... and used temporary rain collection equipment made of the same materials that would be inside the more permanent wet deposition equipment.
They used High-Density Polyethylene Plastic 5-gallon buckets.



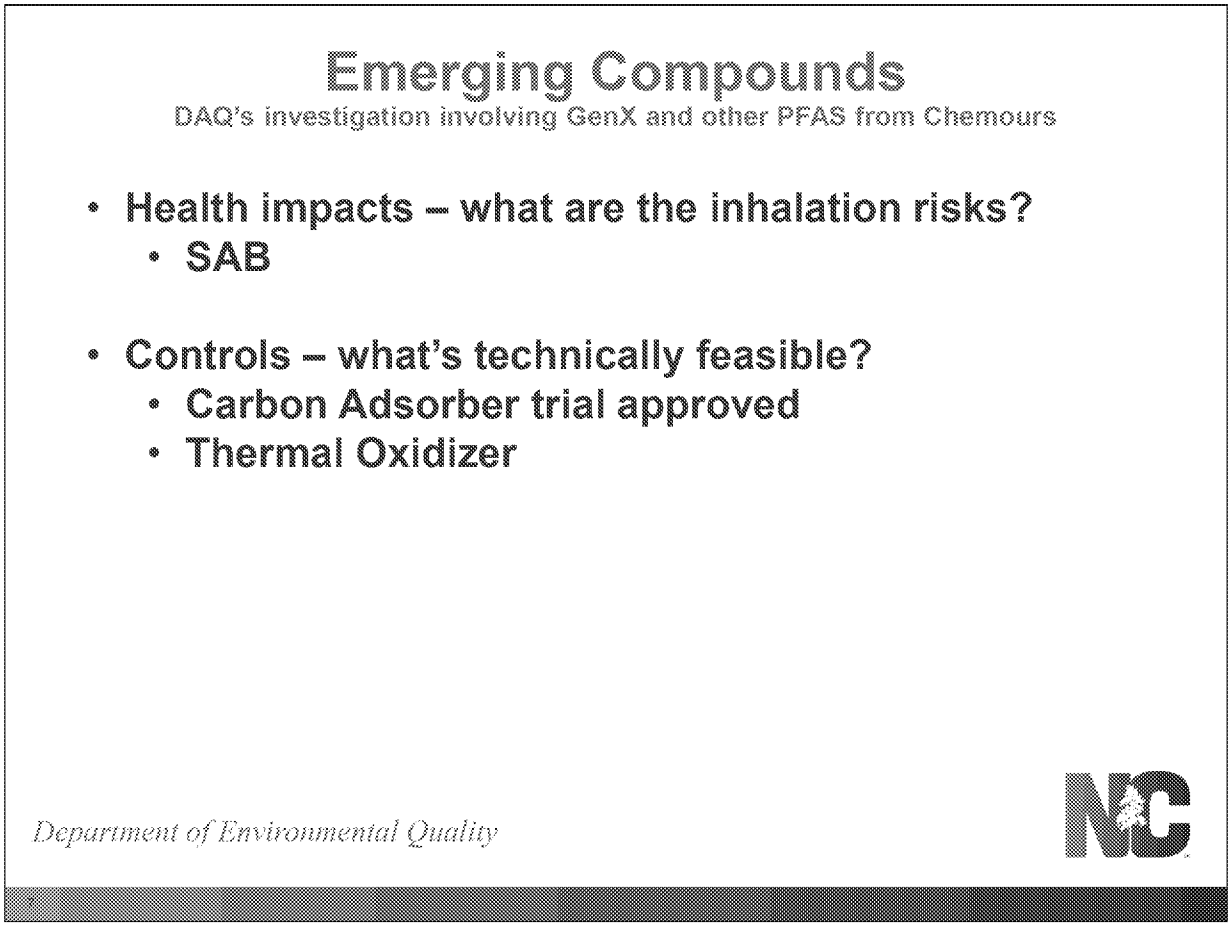
Some of the early results from January 28-29 showed GenX in the rainwater at a number of the locations.
Early in this rain event, the winds blew from the SSE... which would support the findings circled on this image.



Later, during the same rain event, the winds shifted... and started blowing from the Northeast... supporting the results circled on this image.



This rain event spanned Feb 28-Mar 2.
The samplers were again placed in areas where DAQ thought the maximum impacts might occur based on the forecasted conditions.
For this event, this experiment was designed differently to try to assess how far the GenX compounds might travelling downwind prior to being deposited through rain processes.
The concentric circles you see on the map are at distances of 3, 5 and 7 miles from the center of the facility.
The winds blew from the southwest during most of the rain event.
The results indicated GenX values as high as 810 ppt at one of the samples 5 miles downwind of the center of the facility, and values of 45 to 60 ppt 7 miles downwind.
After analysis of each of these rain sampling events where we looked at the meteorological conditions and coupled that with information about how the facility was operating at that time... we feel that the results solidly support the earlier hypothesis that air emissions are causing and contributing to groundwater violations.



On parallel tracks to the emissions and ambient air quality analysis are:

Assessing the potential inhalation risks associated with the GenX compounds. We've asked the Secretary's Science Advisory Board to look into that.
Assessing the control options. We have been discussing those with the company and have already approved a near-term trial of some carbon adsorbers for some of the sources.

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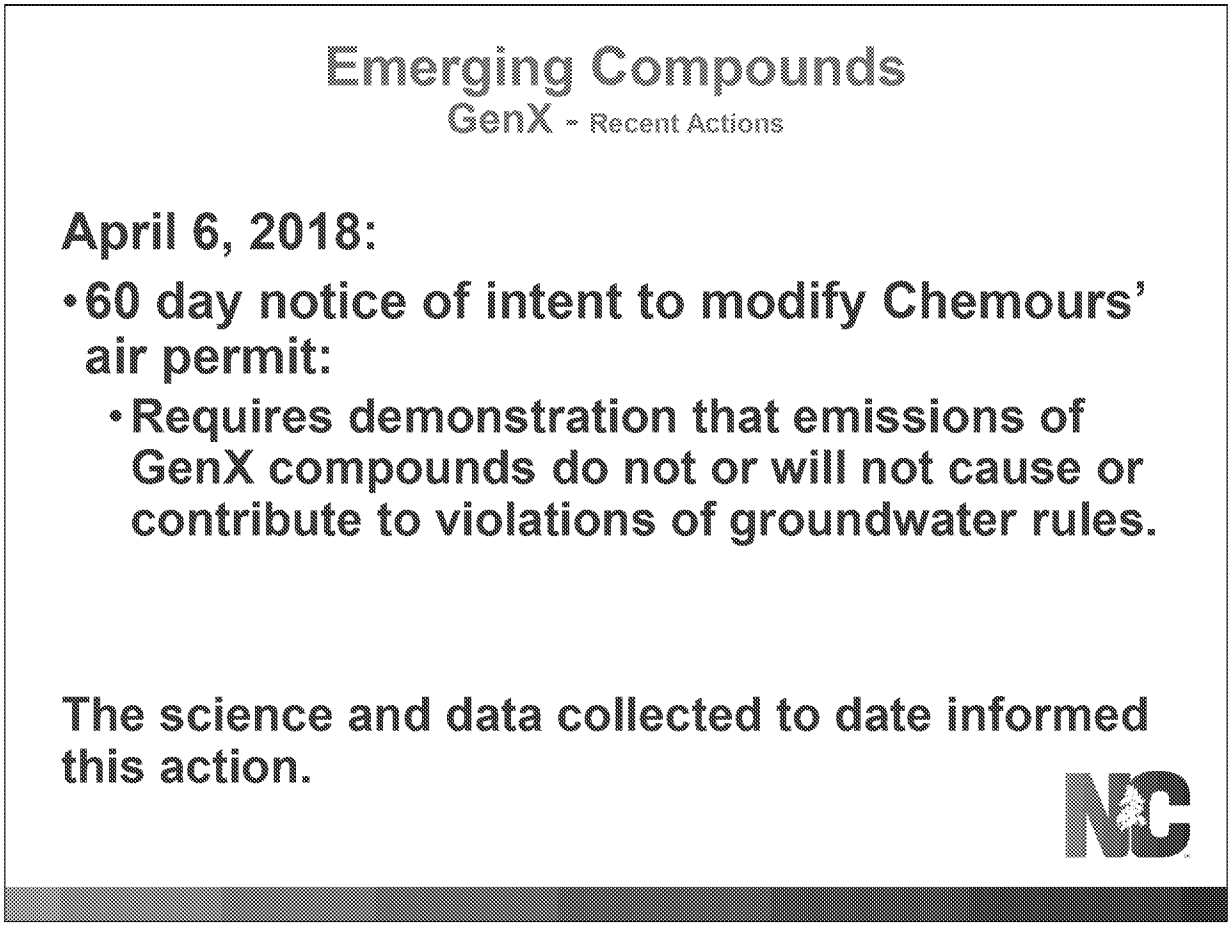
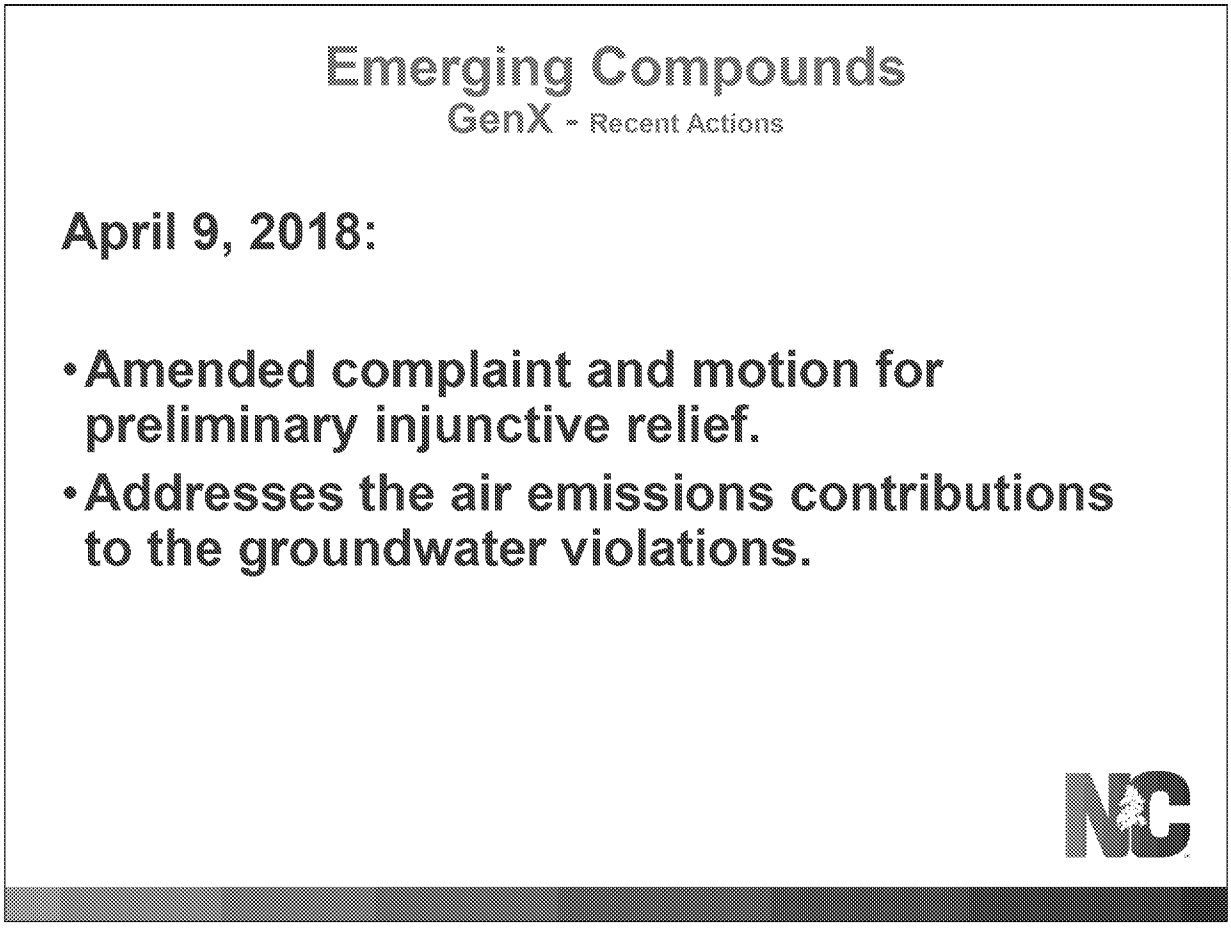
Summary of facts:

- The measured air emissions of GenX compounds are significantly higher than previously understood and reported.
- The GenX compounds are deposited on the land by rainfall at distances of at least 7 miles from Chemours.
- The evidence of atmospheric deposition of GenX shows a geographic footprint that is similar to the detection of GenX in groundwater samples.

...And because GenX is not a naturally occurring compound and there are not other producers or users of GenX in NC, the data demonstrate groundwater violations being caused by air emissions of GenX.



If they respond to the satisfaction of our agency regarding the contributions to groundwater violations, then we'll modify the permit with enforceable conditions corresponding to the alternate operating conditions and/or level of emissions control. That will take effect on the date of the modification. If they do not respond to the satisfaction of our agency, then DAQ will proceed with modification of the Permit to prohibit emissions of GenX compounds, effective on the date of the modification.



DEQ filed an amended complaint and motion for preliminary injunctive relief against the Chemours in Bladen County Superior Court on Monday. Through this action, the state aims to require Chemours to control air emissions of GenX compounds; remove, treat or control all other sources of GenX compounds; and provide a full accounting of any process wastewater discharge through a drainage ditch at the site.

This action expanded the scope of a Sept. 7 complaint filed by the agency alleging multiple violations of water and air resource laws at the facility.